A SPECTROSCOPY BASED P-CHEM LAB, INCLUDING A DETAILED TEXT AND LAB MANUAL

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Rochester's second semester physical chemistry lab course is based on spectroscopy experiments and follows a full semester of quantum mechanics lectures. The laboratory course is fully separate from the traditional physical chemistry course and has its own lectures. The lab course is constructed to achieve three major goals: provide a detailed knowledge of the instrumentation that acquires data, establish a good understanding of how that data is analyzed, and give students a familiarity with spectroscopic techniques and quantum mechanical models. Instrumentation is emphasized by using common components to construct different experiments. Microwave, modulation and detection components are used for both OCS pure rotation and ESR experiments. Optical components, a monochromator, and PMT detectors are used in a HeNe laser induced fluorescence experiment on I_2 *(J. Chem. Ed. 73, 576 (1996))* and a photoluminescence experiment on pyrene *(J. Chem. Ed. 73, 580 (1996))*. OCS is studied in both the microwave and infrared regions, and the C=S stretching vibration is identified through microwave intensity measurements. Lecture notes and laboratory instructions are combined in an exhaustive text of more than 400 pages, containing 325 figures, 285 equations and numerous MathCad data analysis programs. This text can be downloaded as a 10 Mbyte pdf file at chem.rochester.edu/∼muenter/CHEM232Manual.